



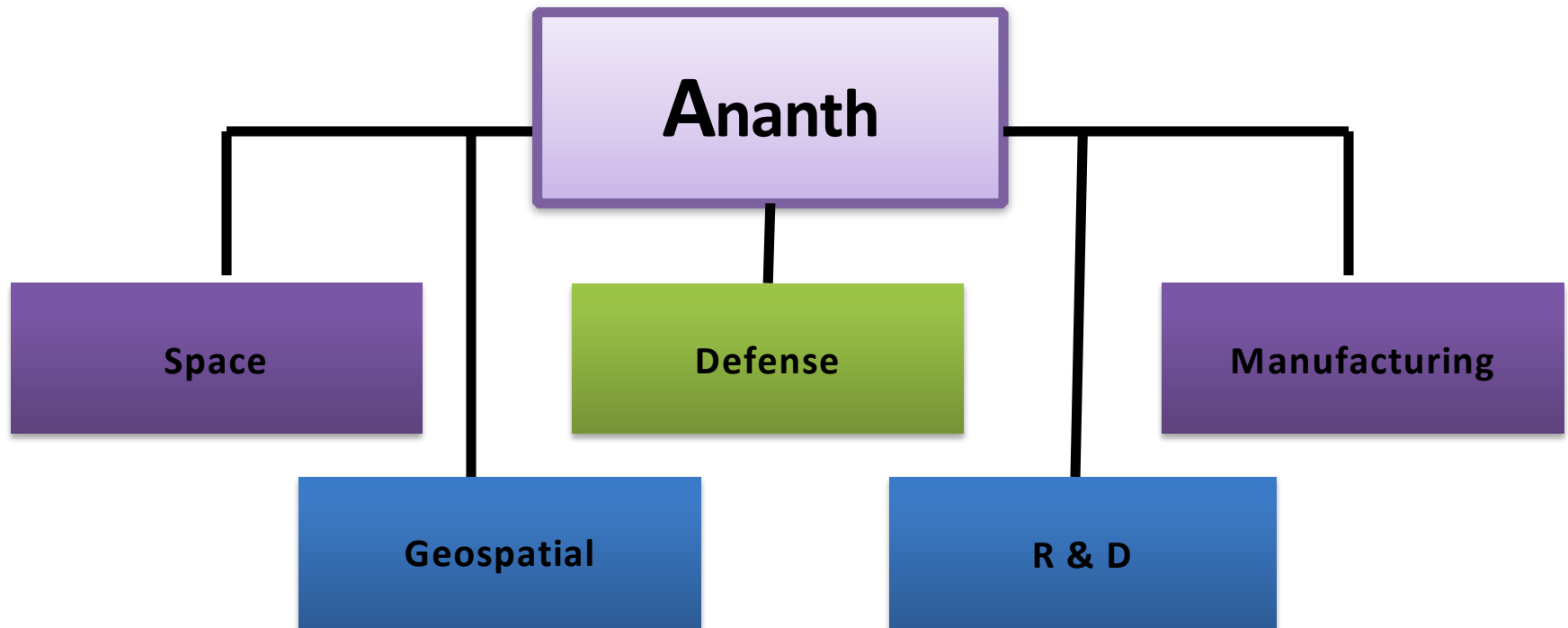
Ananth



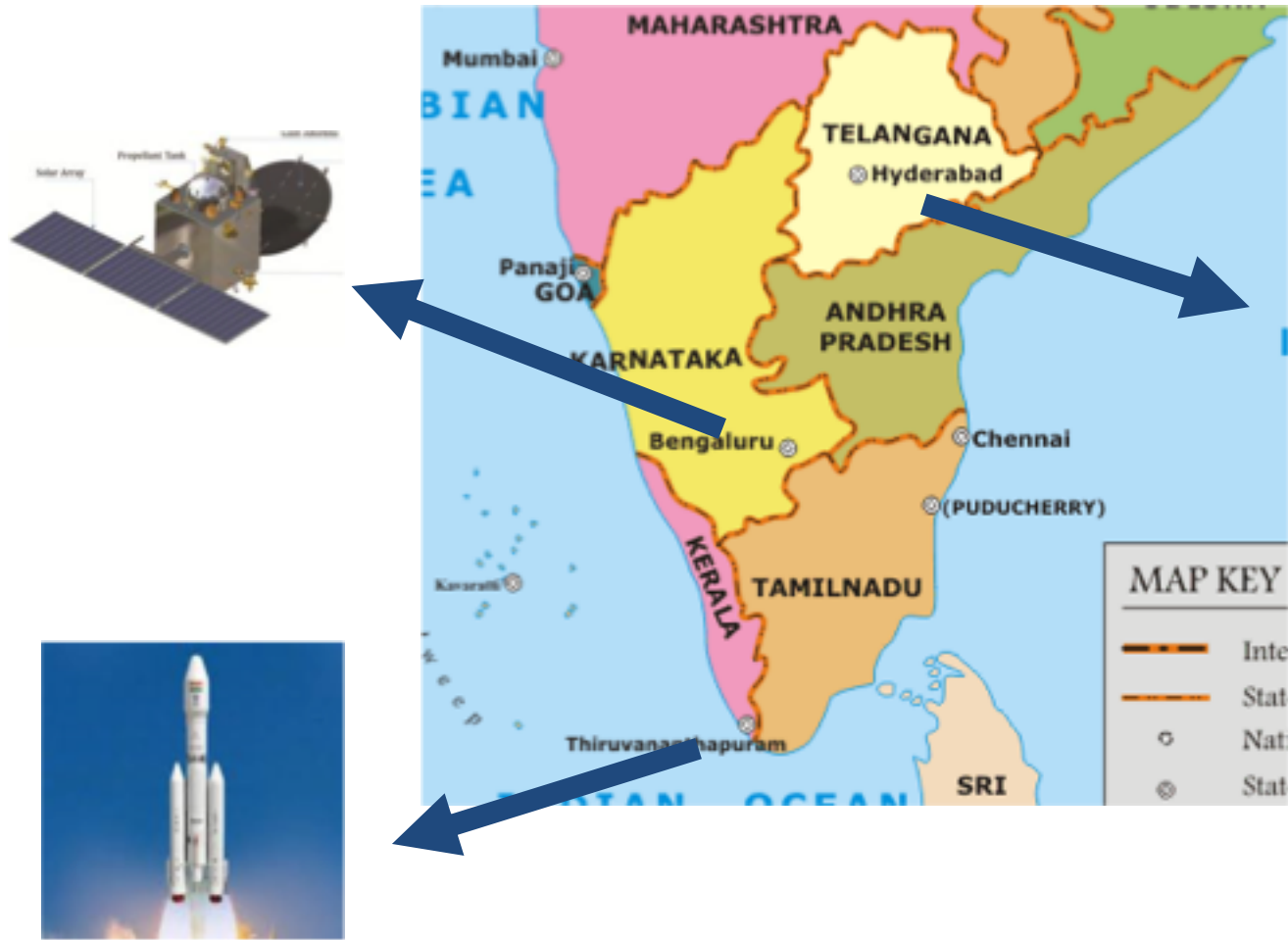
Overview

- Inception in 1992
- Mission: *Indigenization of Space and Defense Systems*
- **AS 9100D** and **ISO 9001:2015** certified
- India's premier private defense and space player
- Avionics Design, Dev, Production and Qualification
- Class 10K/100K Clean Rooms, SMT/MIC production lines, ESS test facilities

Organization



Locations



Ananth facilities



Hyderabad



Thiruvananthapuram



Bengaluru

Clientele

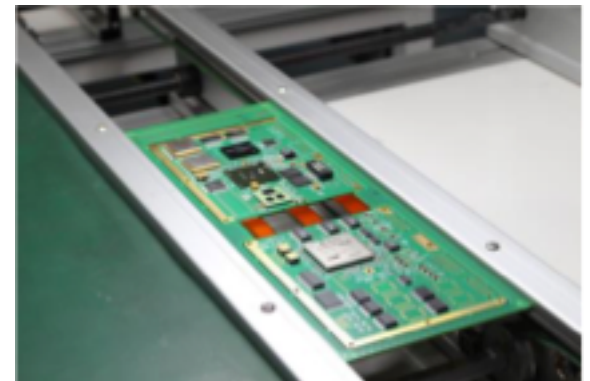
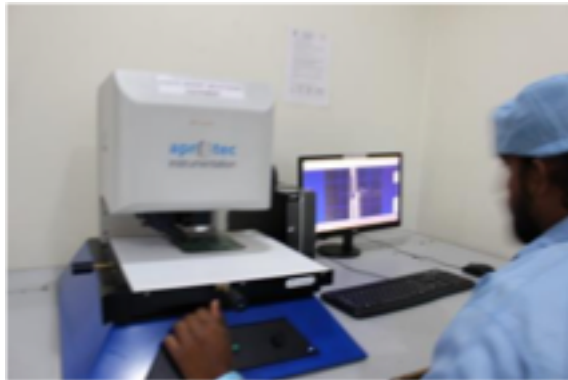
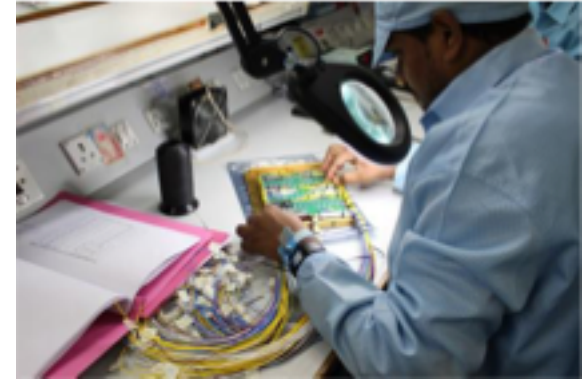


- Digital & Embedded systems
- Telemetry
- Navigation & Controls
- RF and Microwave
- Laser & Optics
- Mechanical

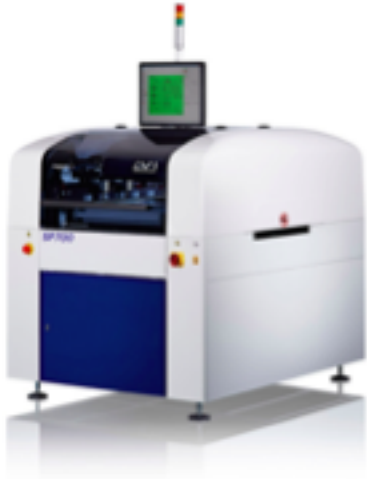
Solutions



Manufacturing Facilities

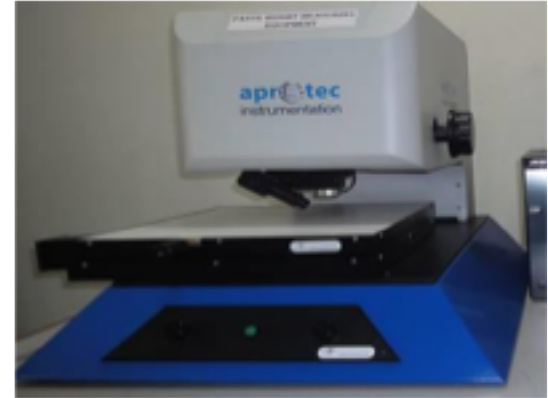


SMT Assembly Line

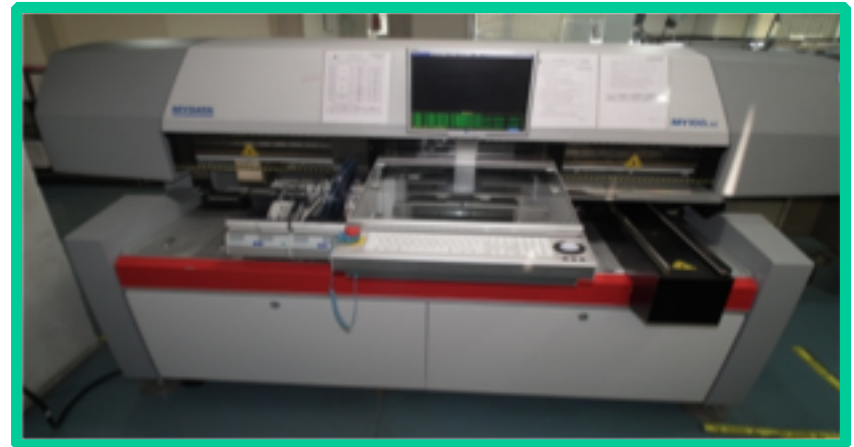


Stencil Printer

Solder paste height
measuring system



Reflow Machine



Pick & Place Machine

MIC Assembly Line



Environmental Test Facilities



Humidity Chamber



Vibration Shakers



Thermal Chamber



Acceleration / Centrifuge



Rate Table

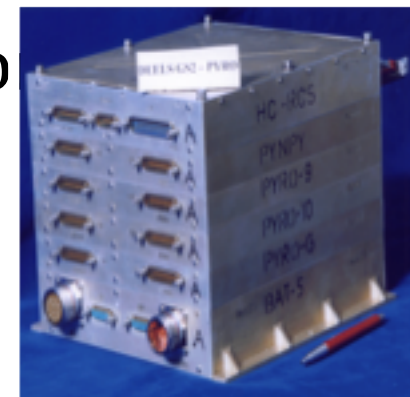


Bump Test machine

Launch Vehicle Avionics



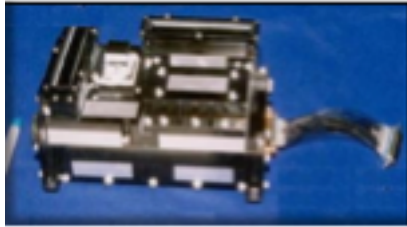
- Navigation, Guidance, Control
- TTC & Power
- Communication
- Servo Controls
- Stage Harnessing & Integration
- Inertial Sensors



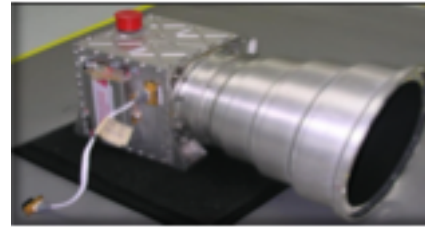
Satellite Avionics



Attitude & Orbit
Control Elec.



Sun Sensor



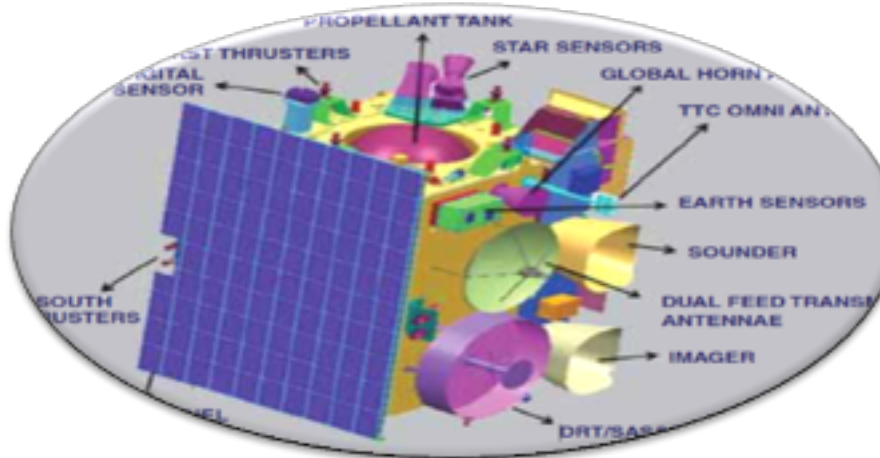
Star Sensor



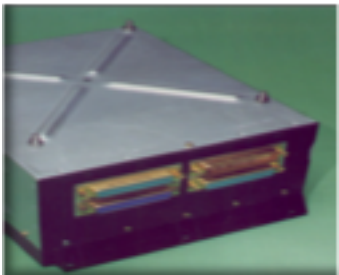
Power Distribution
System



Core Power
System



TTC System



Pyro System



---- DC-DC Converters ----



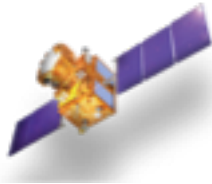
Shunt Electronics

Defense Avionics



- **Telemetry, Tracking & Control**
- **Navigation, Guidance & Control**
- **Controls & Actuators**
- **Optics & Laser**
- **Inertial Systems**
- **Relay Units**
- **RF Systems**

Spacecraft Missions Supported

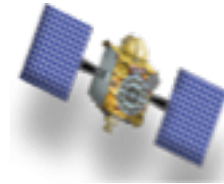


Earth Observation Communication

Cartosat 1
Cartosat 2, 2A-2E
Oceansat 1
Oceansat 2
Megha Tropiques
Resourcesat 1
RiSat



IRNSS 1A, 1B
IRNSS 1C, 1D
IRNSS 1E, 1F
IRNSS 1G, 1H



Navigation

INSAT 3 Series
INSAT 4 Series
GSAT 6, 7, 8, 9
GSAT 11-19
W2M
HYLAS



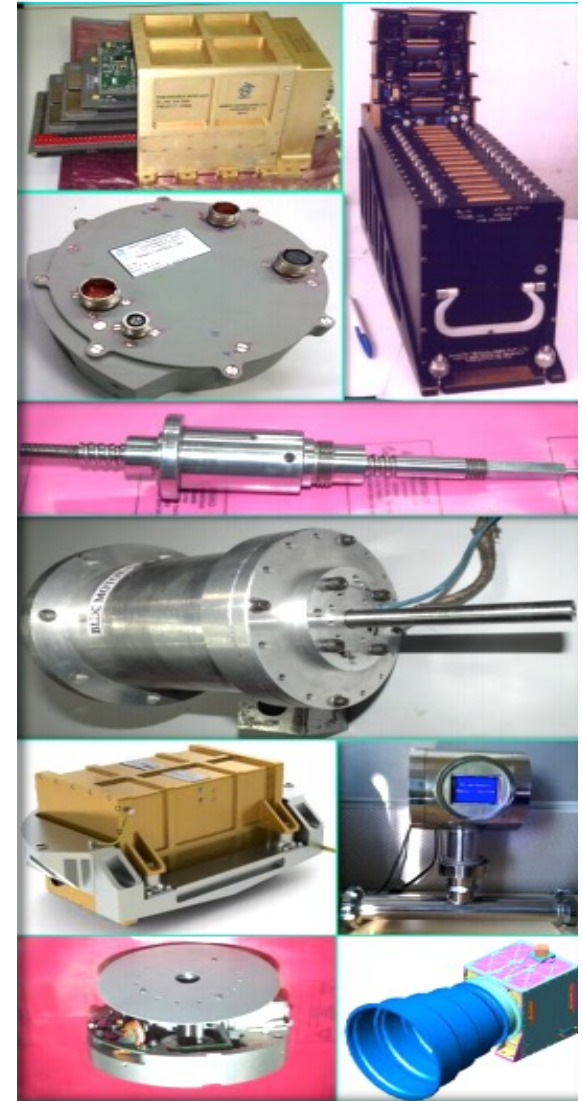
Science

SRE
Moon Mission 1
Moon Mission 2
Mars Mission
ASTROSAT

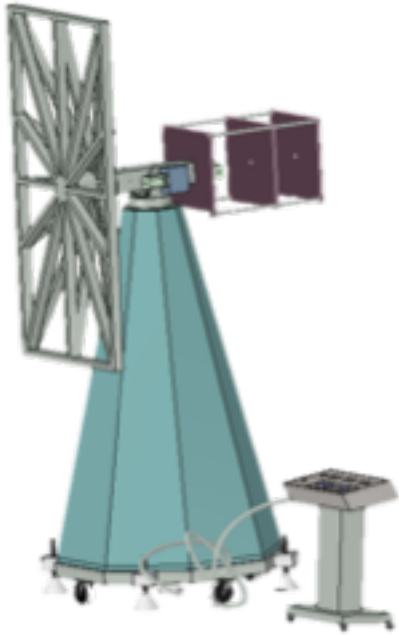
Adherence to international space-quality norms
Zero defect system delivery across all these missions

Mechanical Fabrication

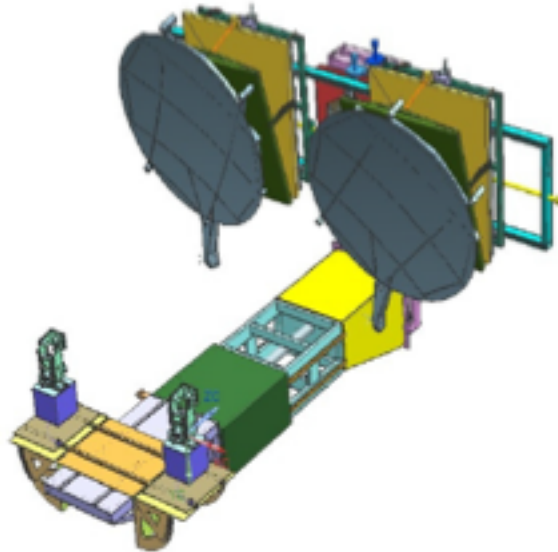
- **3D Modeling and Assembly Checks prior to manufacturing**
- **Assembly Checks and Interference Studies**
- **Stress, Deformation and Model Analysis**
- **Development of Optimal Design**
- **Material Testing prior to machining**
- **CAM Programming for CNC machining**
- **Machining directly from 3D models to minimize human errors**
- **CNC machining under controlled environment**



Satellite Ground Systems



PNF Test Fixture



Antenna Alignment Fixture



Automated Test Systems



HMC Test Jig



Two way MSS Terminal



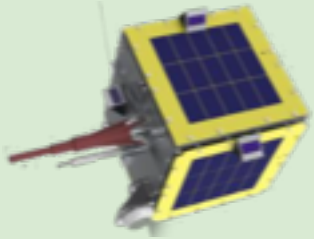
TC Simulator



Harness Tester

Micro/Nano Satellites

SRMSAT



Built & Flown

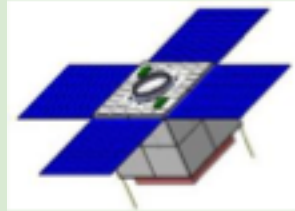
Environ Studies

572 x 341 x 385

10.8 kgs

Payload: *Argus Spectrometer*

SPACENET



Orbit: 570 Km

Communication

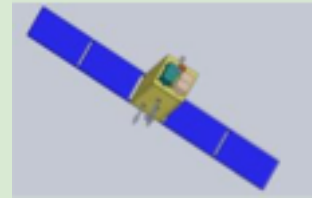
500 mm Cube

50 kgs, 200 W

UHF/VHF

Launch: 2018

STEMSAT



Orbit: 700 Km

Environ Studies

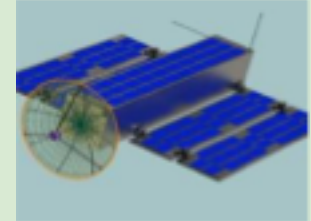
500 x 400 x 400

150 kgs, 160 W

Payload:
Optical/*Thermal IR*

S and X band

ANATHSAT



Orbit: LEO

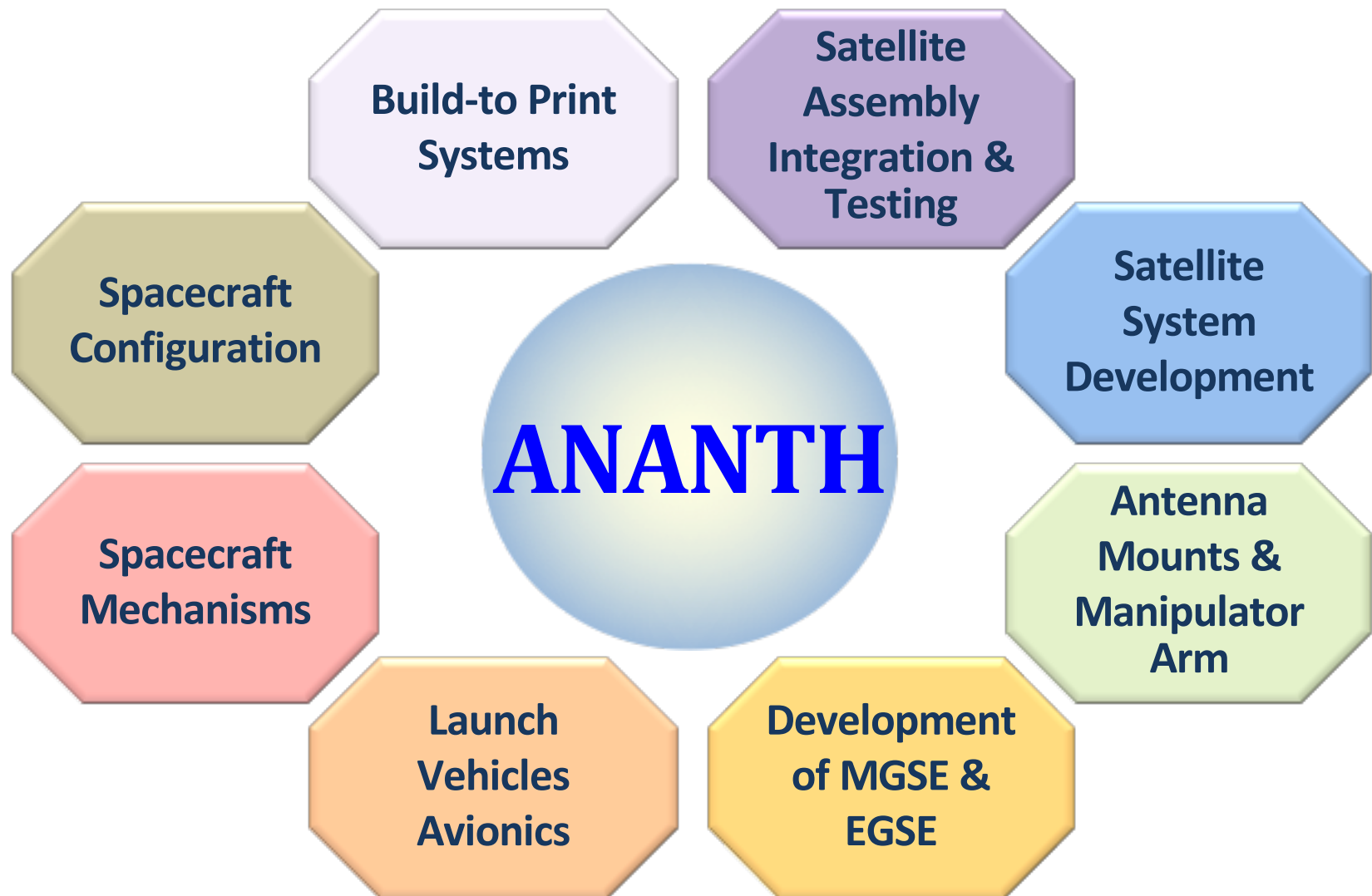
Communication

4U Payload

4 Kgs, > 24 W

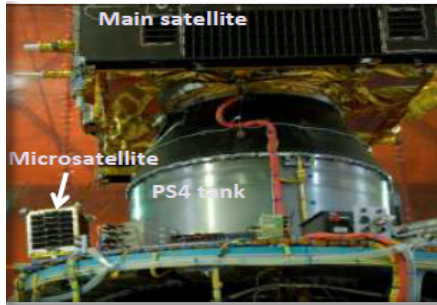
Frequency:
VHF/UHF/S Band

Domain Expertise



Launch Services

Facilitated/ Provided thru' Antrix



- Procurement of Dispenser
- Assembly to S/C
- Mission management
- Interactions with Antrix
- Documentation
- Transportation to SDSC/ SHAR
- Pre-launch activities
- Checks & integration to LV
- Logistics, regulatory, clearances etc.

Space Systems Facility

@ Aerospace Park, near Bangalore International Airport

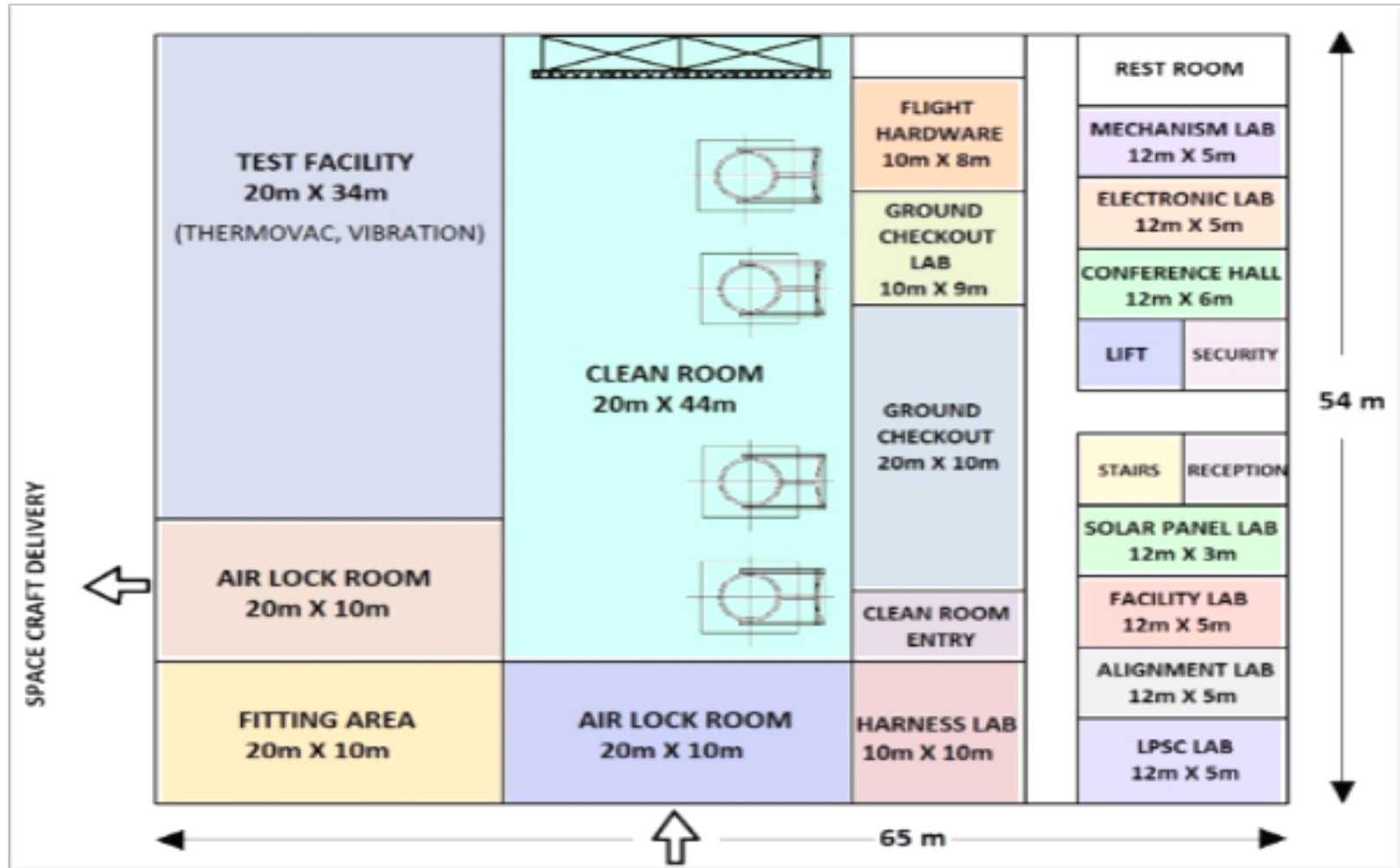


**A modern
facility to
support all
satellite related
activities**

- **Spacecraft Assembly Integration & Test (AIT) Facility for Satellites up to 2000 Kg Class**
- **End-to-End Capability to realise spacecrafts from entry of structure to exit of completely assembled & tested satellite**

Space Systems Facility

@ Aerospace Park, near Bangalore International Airport



Space Systems Facility

@ Aerospace Park, near Bangalore International Airport

- Electronic fabrication
- Mechanical fabrication
- Metrological lab
- Inspection & test facilities for Sub-systems
- Harness fabrication & test facilities
- Thermovac chambers
- Vibration shakers
- Humidity control facility
- Thermal cycling
- EMI/ EM

- Payload preparation & testing area
- Propulsion systems preparation area
- Mechanisms sub-assembly, characterisation & test
- Zero 'G' facility for solar array integration to S/C & deployment tests
- S/C alignment systems
- Thermal systems fabrication & test

Launch Vehicle Systems facility

@ KINFRA PARK, Thiruvananthapuram

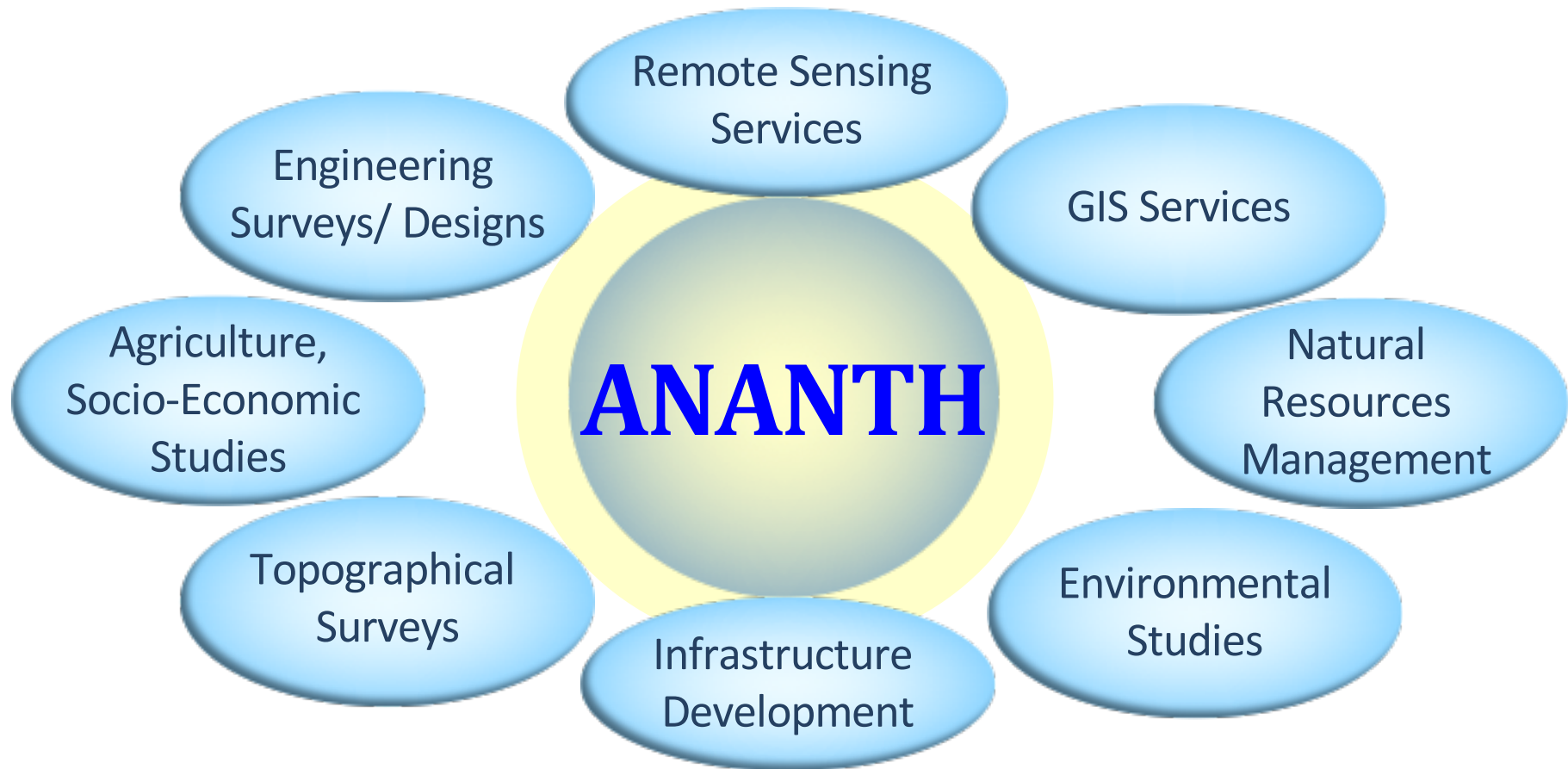


A modern
facility to
support launch
vehicle related
activities

- Avionics package production
- INS sensor fabrication
- Harnessing of stages of PSLV, GSLV-Mk II & III launch vehicles
- Sub-assembly integration
- Test and Evaluation
- Environmental test facilities

EO/ Geo-spatial Services

Proven achievements over 25 yrs in offering innovative, affordable, flexible solutions meeting a variety of customer requirements



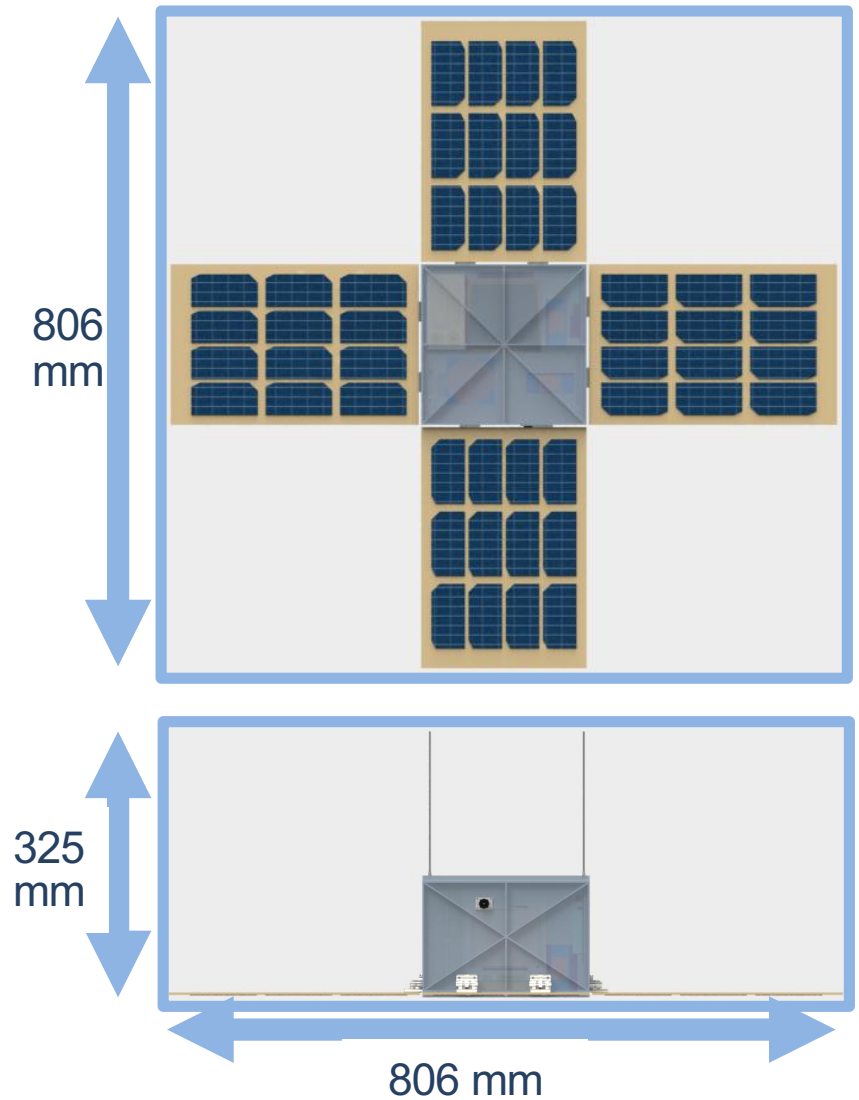
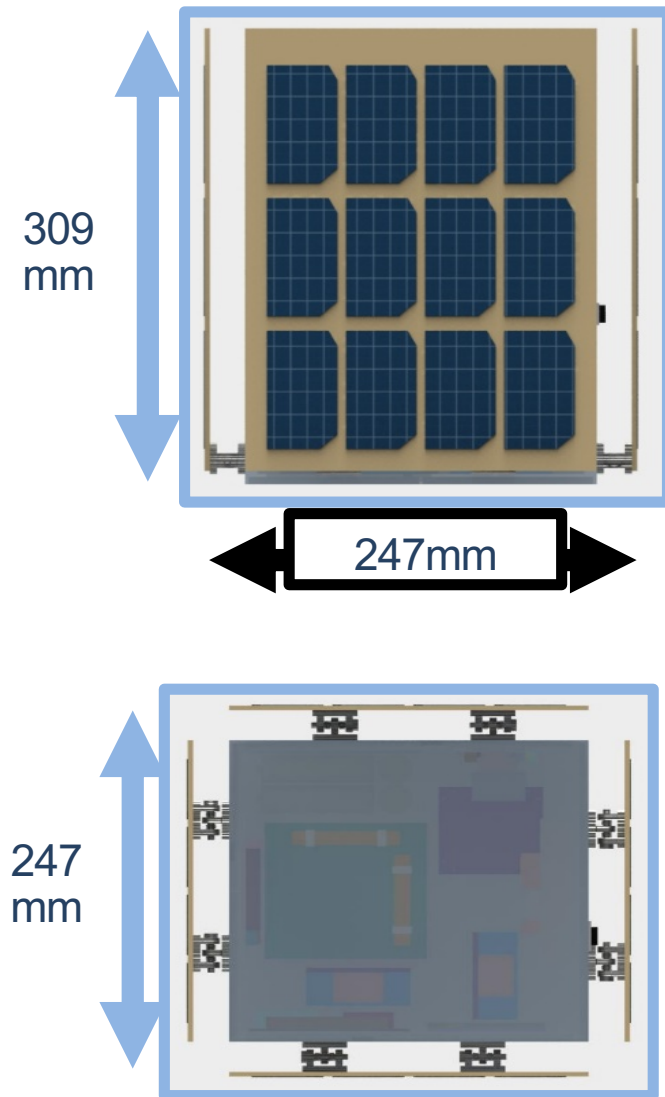
ASTROME

Mission is to provide location-free, cost-effective broadband internet to all developing countries lying between 35 deg N and 35 deg S latitudes

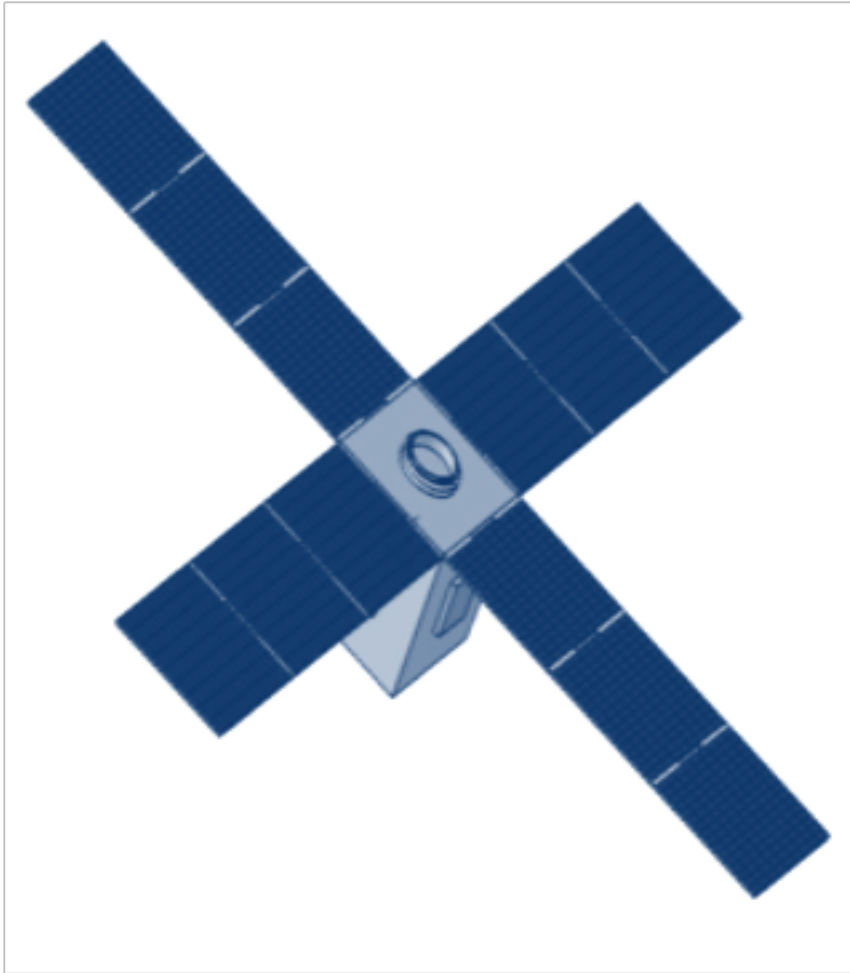


- | | |
|--|----------|
| • Spacenet-E Test Spacecraft | Mar 2019 |
| • Mini constellation of 10 Spacecraft Ns | 2020 |
| • Balance 190 Spacenet Ns | 2021 |

SPACENET - E



SPACENET - E



- **Communication payload**
- **Orbit - LEO**
- **Wt - 150 kgs.**
- **Size: 1000 mm Cube**
- **TTC, RF - S band**
- **Life - 5 years**
- **Launch - Q4 2019 - 2021**
- **Mini constellation 10**
- **Full constellation 190**

Certifications



In Summary Ananth has...

- Design & Manufacturing Facility, Skilled Manpower and Expertise
- Space-Qualified Company meeting Stringent International Quality standards, Excellent Track-record
- Initiated Development & Manufacture of Nano and Micro Satellites for different Mission configurations, and Fast-track Productionisation
- New infrastructure coming up at Bangalore Aerospace Park, with all facilities including a clean room
- Keen to participate/ collaborate in development and manufacturing of small satellites
- Forging innovative results in other aerospace fields through space technology

THANK YOU

Dr. Subba Rao Pavuluri
Chairman & Managing Director

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